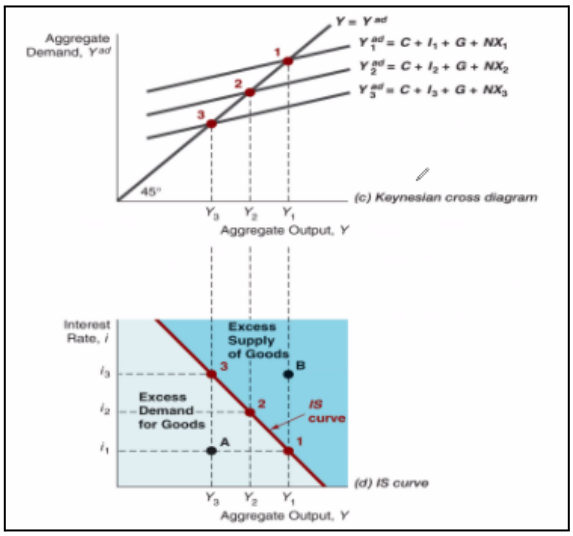
IS CURVE

Indirect relationship between Interest Rate and Income level.

- As interest rate decreases, income rises. Vice versa.

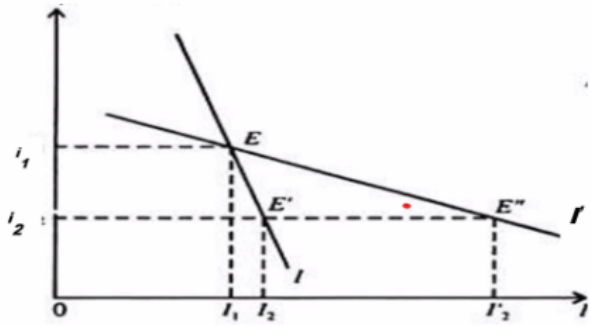

Aggregate Demand, Y^{ad}
$Y = Y^{ad}$
$Y_1^{ad} = C + I_1 + G + NX_1$
$Y_2^{ad} = C + I_2 + G + NX_2$
$Y_3^{ad} = C + I_3 + G + NX_3$
45°
(c) Keynesian cross diagram
Aggregate Output, Y
Interest Rate, i
Excess Supply of Goods
Excess Demand for Goods
IS curve
(d) IS curve
Aggregate Output, Y

- All points are at equilibrium.
- If point E is added, Point E is NOT at equilibrium because it does not lie on the 45° line. It's positioned above the 45° line, which means aggregate demand is greater than aggregate output at that point, there is excess demand for goods. To restore equilibrium, output needs to increase to catch up with demand.
- If point K is added, Point K is NOT at equilibrium. Because it lies below the 45° line, which means aggregate output is greater than aggregate demand at that point, there is excess supply of goods. To restore equilibrium, output needs to decrease to match the lower level of demand.
- Point E has a combination of L1, Y3
- Point K has a combination of L2, Y1

IS curve shows combinations of interest rate and income level which is consistent with equilibrium in the goods market. Points at the right side of the IS curve represents excess supply of goods. Points at the left side, excess demand of goods.

Equilibrium in the Market for Goods: The IS Curve

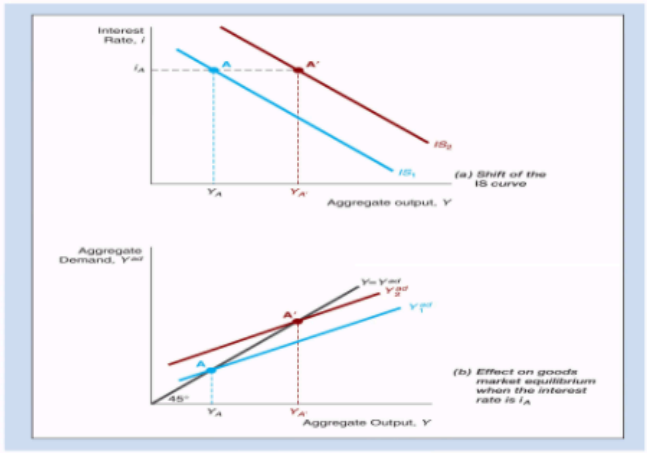
The IS curve shows the different levels of interest rate and output (GDP) at which total investment (I) equals total saving (S). At lower interest rates, investment is higher, which translates into more total output (GDP), so the IS curve slopes downward and to the right.



- I prime is flatter and the other one is steeper.
- Responsive yung investment to interest rate. If the investment curve is sensitive to the income curve, IS curve is also sensitive. However, if ur investment is steep, ur IS curve is also steep (insensitive). The steepness of the curve depends on how sensitive spendings is to changes in the interest rate and also on the multiplier.

Shifts of the IS Curve

The position of the IS curve depends on the level of autonomous spending. If autonomous spending increases, the IS curve will shift to the right.


Interest Rate, i
Aggregate output, Y
(a) Shift of the IS curve
Aggregate Demand, Y^{ad}
45°
Aggregate Output, Y
(b) Effect on goods market equilibrium when the interest rate is i_A

- Expansionary fiscal policy shifts to the right.
- Contractionary fiscal policy, curve will shift to the left.

2 sector economy

Y=S+I

S = I

I = investment

Y = savings

In the 3 sector econ

Y=S+I+G

S+Tx=I+G

SAVINGS plus tax (equilibrum condition ng 3 sector economy)

4 sector economy

Y=C+I+G+Xm

If you use inflow and outflow model

- S+Tx+Import = I+G+X

Lahat ng points diyan nasa equilibirum kapag nasa IS Model.

LM Curve

M=Money supply

L=Money demand (L because Demand of Liquidity)

LM curve shows the interest rate and income relationship. But this time, the relationship is direct.

- As interest rate rises, income rises. High interest rate, money demand decreases then income must increase. As income rises, money demand increases.
- For the market to retain in equilibrium, the income must increase because it would lead to higher demand for money.

Every points in LM curve, nagrrepresent ng equilibrium in the money market which means Md=Ms.

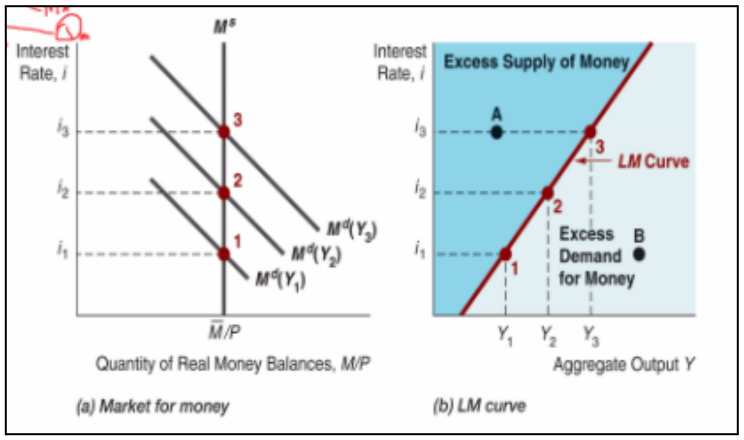
Equilibrium in the Market for Money: The LM Curve

- Demand for money called liquidity preference
- M^d/P depends on income (Y) and interest rates (i)
- Positively related to income
  - Raises the level of transactions
  - Increases wealth
- Negatively related to interest rates

- Instead of holding ur cash, u convert into bonds. As IR increases, ur money is in the form of bonds which lowers the money demand.

Equilibrium in the Market for Money: The LM Curve (cont'd)

- Connects points that satisfy the equilibrium condition that $M^D = M^S$
- For each level of aggregate output, the LM curve tells us what the interest rate must be for equilibrium to occur
- The economy tends to move toward points on the LM curve



- *Factor like Income level increases, MD curve will shift to the right.*

Left graph

- Point 1: Combination of I1and Y1
- Point 2: I2 and Y2
- Point 3: I3 and Y3
- All points are at equilibrium, meaning MS = MD.
  - *The goods market is at equilibrium when I = S (Investment equals Saving), or equivalently when aggregate demand equals aggregate output — which is represented by any point on the IS curve.*

- If point E (I2, Y1) is added, it is not in equilibrium. Based on its position, it appears to be at interest rate i_2 but at a money quantity less than M/P. This means it is to the left of the Ms line, If Point E is to the left of the Ms line but above the corresponding Md curve, then money supply is greater than money demand — there is excess supply of money (interest rate bababa). To restore equilibrium, interest rates need to fall to encourage people to hold more money, increasing money demand back up to match the fixed money supply.
- If Point C (Ic, Y3) is added to the right of the Ms line, then money demand is greater than money supply — there is excess demand for money (interest rate tataas).

To restore equilibrium, interest rates need to rise to discourage people from holding money, reducing money demand back down to match the fixed money supply.

The LM schedule is positively sloped. This means that an increase in the interest rate reduces the demand for money. To maintain the demand for money equal to the fixed supply, the level of income has to rise. Accordingly, money market equilibrium implies that an increase in the interest rate is accompanied by an increase in the level of income.

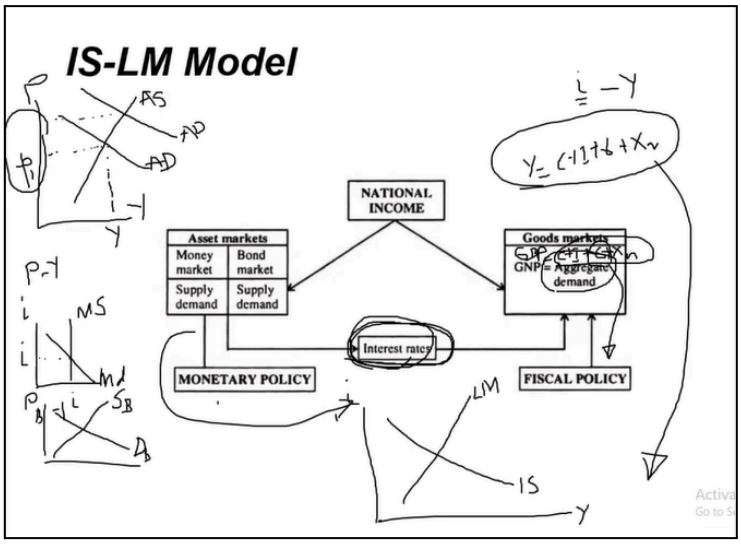
L = kPY — hi, k. h > 0. The parameters k and h reflect the sensitivity of the demand for money to the level of income (Y) and the interest rate (i),

The greater the responsiveness of the demand for money to income, as measured by k, and the lower the responsiveness of the demand for money to the interest rate, as measured by h. the steeper the LM curve will be.

A given change in income, ΔY, has a larger effect on the interest rate, i, the larger is k, and the smaller is h, If the demand for money is fairly inelastic, so that h is close to zero, the LM curve is nearly vertical.

If the demand for money is fairly elastic (i.e., very sensitive to the interest rate), so that h has a high value, then the LM curve is almost horizontal. In that case, a small change in the interest rate must be accompanied by a large change in the level of income in order to maintain money market equilibrium.

RECORDED LESSON



Aggregate Demand – Aggregate Supply (AD-AS)

Ginagamit ang AD-AS model para makita ang epekto ng policies sa price level at output/income level. Kapag long run, vertical ang Aggregate Supply (AS) curve dahil flexible ang wages at prices, na isang assumption ng Classical Economics.

Kapag may expansionary monetary policy, nagshi-shift ang Aggregate Demand (AD) curve sa right, tumataas ang price level, at nagkakaroon ng demand-pull inflation. Kaya ginagamit ang AD-AS framework kapag pinag-aaralan ang epekto ng policies sa price level at output.

However, in the analysis of the IS-LM model, the focus is on determining the relationship between interest rate and income. The level of income is affected by the goods market and the capital market, particularly the money market. Given the money market and bond market, these affect the national income in the economy because they are associated with the interest rate.

Interest rate is determined by money supply and money demand, while bond prices are determined by the supply and demand for bonds. There is an inverse relationship between bond prices and interest rates. The money market deals with short-term instruments, while the bond market deals with long-term instruments.

The interest rate affects aggregate demand in the goods market, where:

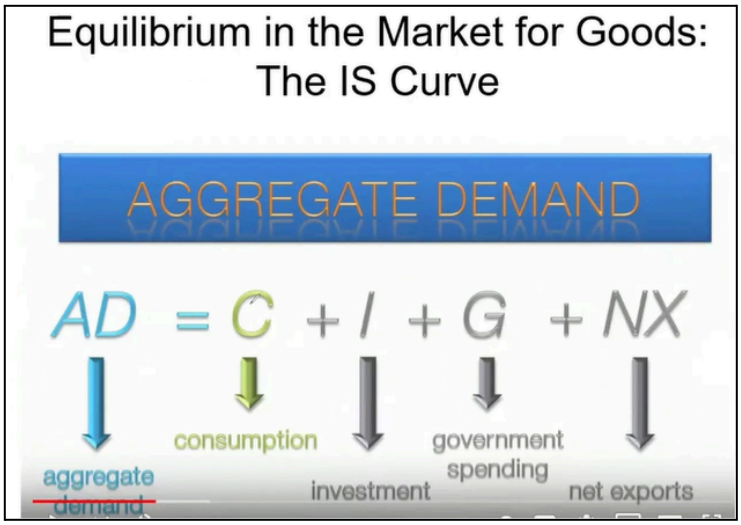
$$Y = C + I + G + X_n$$

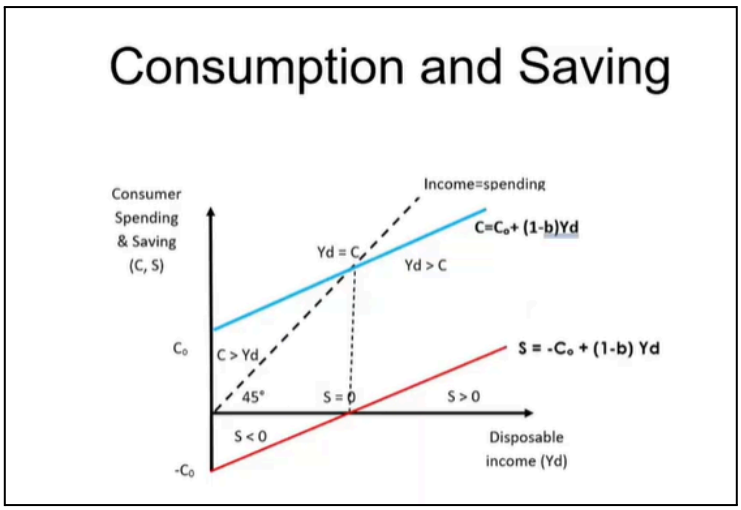
Therefore, when discussing the IS-LM model, the focus is on the relationship between interest rate and income level, as well as how fiscal policy, such as taxation and government spending, affects aggregate demand. When the government imposes taxes or changes government spending, aggregate demand is affected.

Monetary policy, on the other hand, pertains to the regulation of money supply and money demand. The IS-LM diagram shows the relationship between the goods market and the asset market. The goods market determines income through:

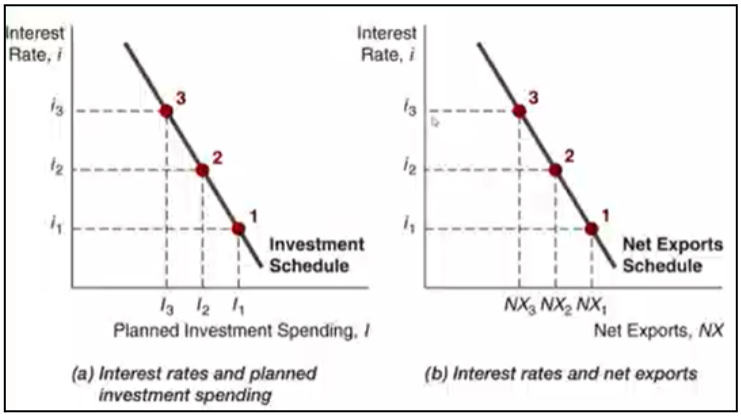
$$Y = C + I + G + X_n$$

while the interest rate is determined in the money market.



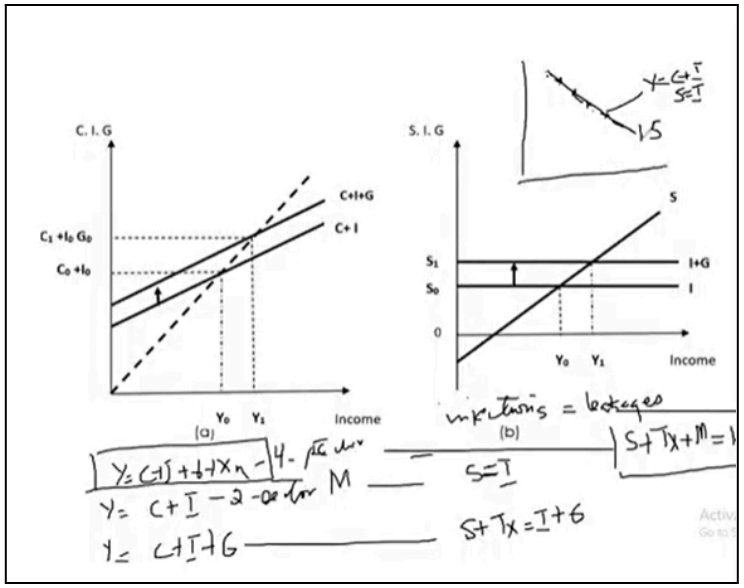


Dito naman makikita na ang consumption curve at saving curve ay upward sloping because these two are directly related to disposable income. As disposable income increases, both consumption and savings also increase.



There is an inverse relationship between interest rate and investment. If the interest rate rises, investment decreases because the opportunity cost of borrowing becomes higher.

When it comes to net exports, there is also an inverse relationship because interest rates influence the level of capital inflows.



If ip-plot to determine the equilibrium income,

2-sector model:

$$Y = C + I$$
$$S = I$$

Savings is considered a leakage because it does not contribute to the expansion of the output level and does not create a multiplier effect.

Investment, on the other hand, is considered an injection because it contributes to economic activity and affects the level of output.

Downward sloping ang IS curve dahil kapag tumataas ang interest rate, bumababa ang investment, at bumababa rin ang income/output. Kaya inverse relationship ang interest rate at income.

Kapag nasa IS curve ang point, equilibrium ang goods market. Kapag nasa right side ng IS curve, may excess supply of goods. Kapag nasa left side naman, may excess demand for goods.

3-sector model:

$$Y = C + I + G$$
$$S + T = I + G$$

- Investment and government spending are considered injections because they contribute to

the expansion of economic activity and increase output.

- Taxes (T), on the other hand, are considered leakages because they reduce income. Kapag nababawasan ang disposable income, nababawasan din ang amount na available for consumption and transactions.

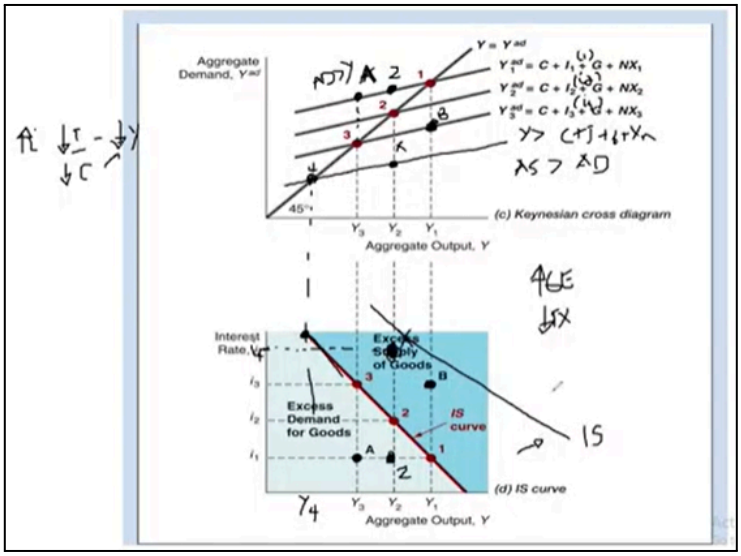
4-sector model (open economy):

$$Y = C + I + G + NX$$

$$S + T + M = I + G + X$$

Investment is always equal to savings at the equilibrium point. This means that injections are equal to leakages, resulting in equilibrium in the goods market.

The IS curve shows the combination of interest rate and the level of income that is consistent with equilibrium in the goods market.



The 45-degree line is the equilibrium line. Kapag naging tangent ang aggregate demand curve sa 45-degree line, iyon ang equilibrium point. Nasa equilibrium ang points 1, 2, at 3, where point 1 is Y1 - i1, point 2 is Y2 - i2, and point 3 is Y3 - i3. From these points, the IS curve is derived because they represent equilibrium points where Y = C + I + G + Xn.

For point 4, the combination is Y4 - i4. Downward sloping ang IS curve dahil may inverse relationship between interest rate and income. Kapag mataas ang interest rate, bumababa ang investment, bumababa ang income, at bumababa rin ang consumption.

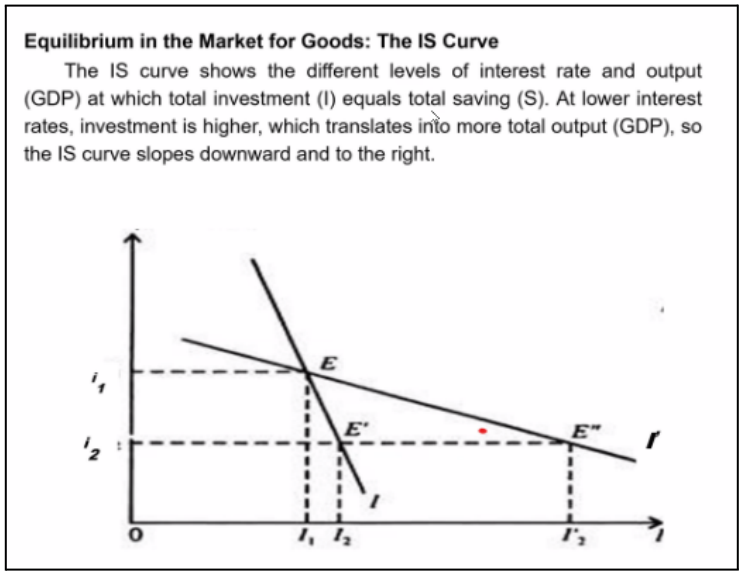
Sa point B, ang combination ay Y1 - i3. Nasa right side ito ng IS curve kaya hindi ito equilibrium point. Ibig sabihin, Y > C + I + G + Xn, kaya may excess supply of goods. Sa point X naman, ang combination ay i4 - Y2. Nasa right side rin ito ng IS curve kaya may excess supply of goods at hindi equilibrium.

Sa point A, ang combination ay i1 - Y3. Hindi rin ito equilibrium dahil nasa above side ito ng equilibrium line. Mas mataas ang aggregate demand kaysa output, ibig sabihin AD > Y, kaya may excess demand for goods. Yung point 2 naman ay nasa excess demand for goods while it lies above the 45-degree equilibrium line.

The IS curve shows the combination of interest rate and the level of income that is consistent with equilibrium in the goods market.

Exogenous Variables - Co, Io, Go, Txo, Xo, Mo. Though sa fiscal policy, Go at Txo lang yung tinitignan.

- The effect of government expenditure on income is that when it increases, it uses expansionary policy. If tax is reduced, the curve will shift to the right because of higher income.
- However, if contractionary, magshi-shift siya sa left.


Equilibrium in the Market for Goods: The IS Curve
The IS curve shows the different levels of interest rate and output (GDP) at which total investment (I) equals total saving (S). At lower interest rates, investment is higher, which translates into more total output (GDP), so the IS curve slopes downward and to the right.
E
E'
E''
I
r

- I′ is flatter, and the other one is steeper.
- Responsive yung investment to interest rate. If the investment curve is sensitive to the interest rate, the IS curve is also sensitive, elastic. However, if your investment is steep, your IS curve is also steep (insensitive). inelastic
- The steepness of the curve depends on how sensitive spending is to changes in the interest rate and also on the multiplier.

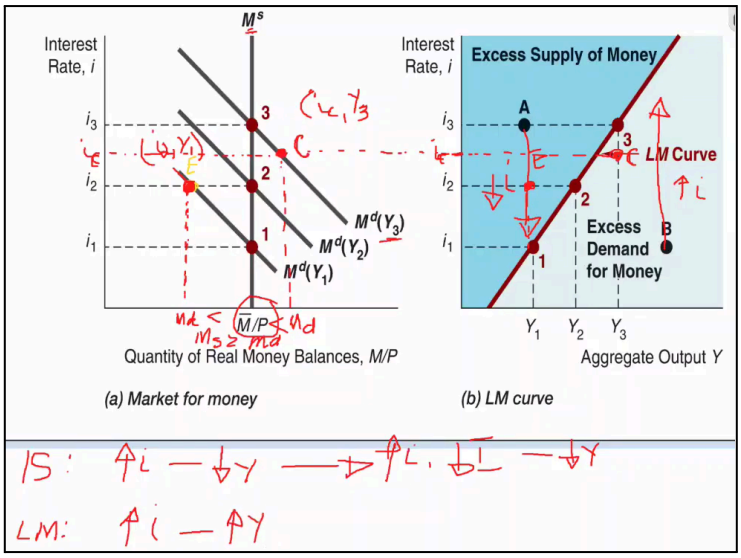
The steepness of the curve depends on how sensitive investment spending is to changes in the interest rate, and also on the multiplier. If a given change in the interest rate (i, to i_2) produces a large change investment (1_1 to I'_2), the investment curve is flat (I') than the investment curve I. IS curve is very flat (IS') if investment is very sensitive to changes in interest rate.

Equilibrium in the Market for Money: The LM Curve

- Demand for money called liquidity preference
- M^d/P depends on income (Y) and interest rates ~~(i)~~
- Positively related to income
  - Raises the level of transactions
  - Increases wealth
- Negatively related to interest rates

Equilibrium in the Market for Money: The LM Curve (cont'd)

- Connects points that satisfy the equilibrium condition that $M^D = M^S$
- For each level of aggregate output, the LM curve tells us what the interest rate must be for equilibrium to occur
- The economy tends to move toward points on the LM curve

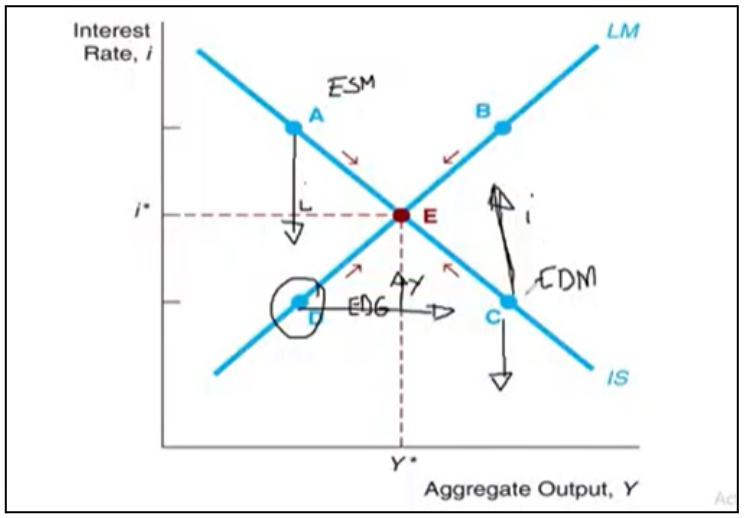


- *Factors like income level increases, MD curve will shift to the right.*

Left graph

- Point 1: Combination of I1and Y1
- Point 2: I2 and Y2
- Point 3: I3 and Y3
- All points are at equilibrium, meaning MS = MD.
  - *The goods market is at equilibrium when I = S (Investment equals Saving), or equivalently when aggregate demand equals aggregate output — which is represented by any point on the IS curve.*

- If point E (I2, Y1) is added, it is not in equilibrium. Based on its position, it appears to be at interest rate i_2 but at a money quantity less than M/P. This means it is to the left of the Ms line, If Point E is to the left of the Ms line but above the corresponding Md curve, then money supply is greater than money demand — there is excess supply of money (interest rate bababa). To restore equilibrium, interest rates need to fall to encourage people to hold more money, increasing money demand back up to match the fixed money supply.
- If Point C (Ic, Y3) is added to the right of the Ms line, then money demand is greater than money supply — there is excess demand for money (interest rate tataas). To restore equilibrium, interest rates need to rise to discourage people from holding money, reducing money demand back down to match the fixed money supply.



Let us put together ISLM, at point E, the goods market is in equilibrium, the money market also. B is in LM, D also. Tho yung B ay nasa excess supply of goods. It will move towards your IS which is A na irereduce mo yung production. Kapag naman may have an excess supply of money, dagdagan interest rate. Yung point D wala sa equilibrium, nasa excess demand of goods siya. Kaya mag mmove siya sa c towards the equilibrium. If it is in the goods market, output mag aadjust. Kapag naman nasa money market, interest rate yung mag aadjust. C is there is an excess demand for money, also

Using a Policy Mix

The Effects of Fiscal and Monetary Policy.

	Shift of IS	Shift of LM	Movement of Output	Movement Interest
Increase in taxes	left	none	down	down
Decrease in taxes	right	none	up	up
Increase in spending	right	none	up	up
Decrease in spending	left	none	down	down
Increase in money	none	down	up	down
Decrease in money	none	up	down	up

Policy	Output	Interest
Expansionary Fiscal	↑	↑
Contractionary Fiscal	↓	↓
Expansionary Monetary	↑	↓
Contractionary Monetary	↓	↑

Fiscal Policy vs Monetary Policy

Ang fiscal policy ay tungkol sa taxation at government spending.

Effects ng Fiscal Policy:

- Government spending ↑ → IS shifts right → income ↑ → interest rate ↑
- Taxes ↓ → IS shifts right → income ↑ → interest rate ↑
- Government spending ↓ → IS shifts left → income ↓ → interest rate ↓
- Taxes ↑ → IS shifts left → income ↓ → interest rate ↓

Ang fiscal policy ay IS curve lamang ang naaapektuhan.

Ang monetary policy naman ay tungkol sa money supply.

Effects ng Monetary Policy:

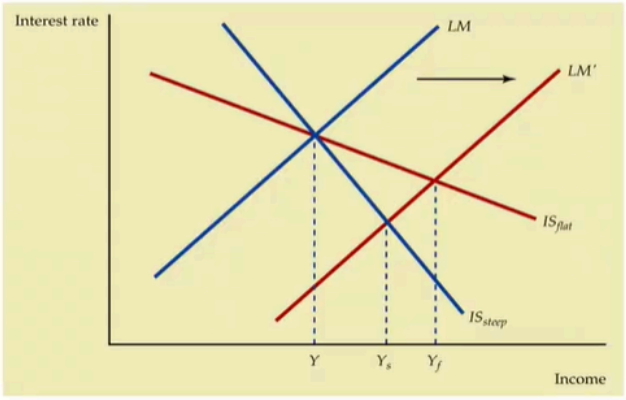
- Money supply ↑ → LM shifts right → income ↑ → interest rate ↓
- Money supply ↓ → LM shifts left → income ↓ → interest rate ↑

Ang monetary policy ay LM curve lamang ang naaapektuhan.

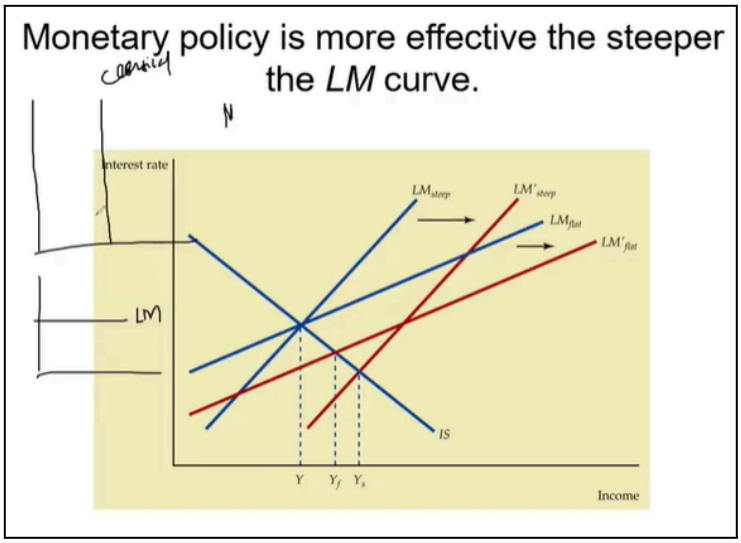
Monetary Policy, the Interest Rate, and the LM Curve

- ***Monetary contraction (tightening)*** refers to a decrease in the money supply.
- An increase in the money supply is called ***monetary expansion***.
- Monetary policy affects only the *LM* curve, **not the *IS* curve**.

Monetary policy is more effective the flatter the *IS* curve.



Kapag nag-shift sa right ang LM curve, mas effective ang monetary policy kapag sensitive ang investment sa interest rate. Kapag steep ang IS curve, insensitive ang investment sa interest rate kaya maliit lang ang change sa income. Kapag flatter naman ang IS curve, mas sensitive ang investment sa interest rate kaya mas malaki ang change sa income.



The LM curve is vertical kapag perfectly insensitive ang money demand sa interest rate. Kapag horizontal naman ang LM curve, nandun ang liquidity trap where money demand becomes highly sensitive to interest rate. In the classical case, money is mainly used only as a medium of exchange.

Fiscal Policy, the Interest Rate and the IS Curve

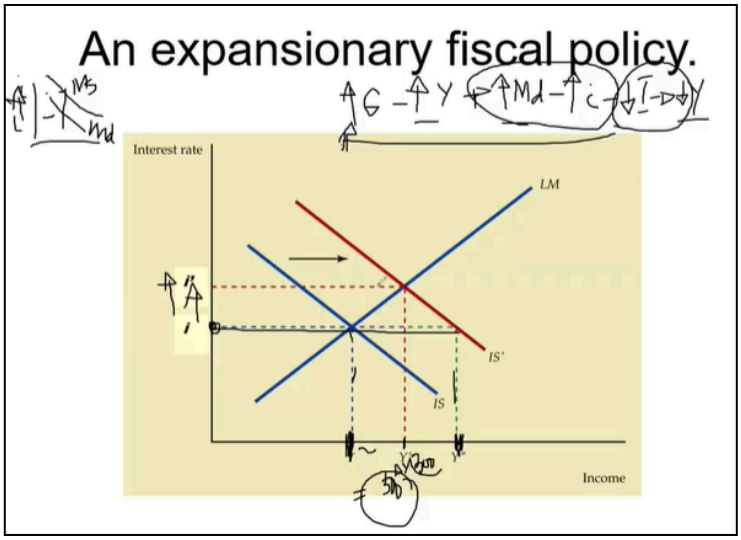
Fiscal contraction: a fiscal policy that reduces the budget deficit.

- Reducing G or increasing T

Fiscal expansion: increasing the budget deficit.

- Increasing G or decreasing T

Taxes (T) and government expenditures (G) affect the IS curve, not the LM curve.



Kapag nag-shift sa right ang IS curve, tumataas ang income. However, this may lead to a crowding out effect. Kapag nag-impose ng expansionary fiscal policy, ang objective ay pataasin ang income, pero kasabay nito ay tumataas din ang interest rate.

Tumataas ang money demand dahil tumataas ang income, at kapag tumaas ang money demand, tumataas din ang interest rate. Ang money market ay nakakaapekto naman sa goods market because the increase in interest rate results in lower investment, which eventually leads to lower output.

Dahil naapektuhan ng pagtaas ng interest rate ang investment, nababawasan ang epekto ng increase in income. Halimbawa, imbes na maging 500 ang increase sa output or income, nagiging 250 na lamang dahil sa crowding out effect.

Crowding-out effect

Crowding out occurs when an increase in government spending results in less spending by the private sector. This occurs when the government borrows more when interest rates are low to finance its expenditures, thus pushing interests upward. Business firms that wanted to borrow at the lower interest rates, no longer borrow when the interest rates went up, thus business spending fell.

Higher interest rates will reduce investment spending which will tend to reduce the increase in GDP.

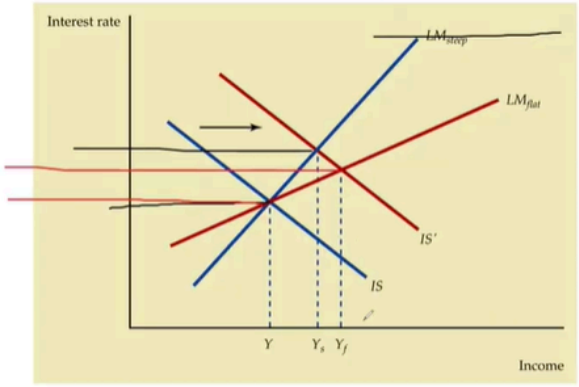
Therefore, the net effect of increased government spending will be diminished by the reduction in investment spending.

Ang crowding out effect ay nangyayari kapag tumaas ang government spending. Dahil dito:

1. *tumataas ang income*
2. *tumataas ang money demand*
3. *tumataas ang interest rate*
4. *bumababa ang private investmentb*

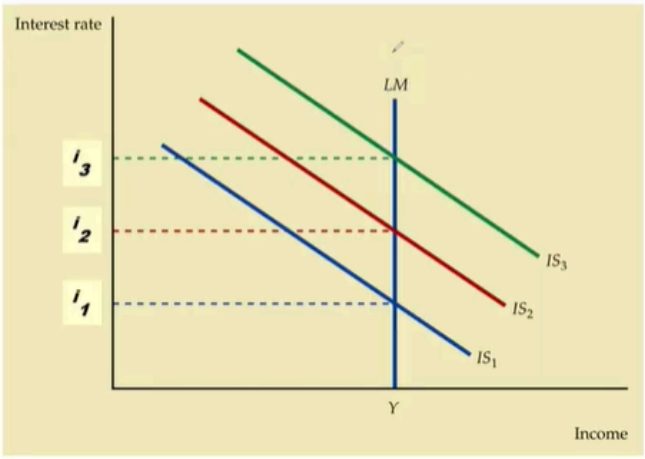
Resulta nito ay nababawasan ang increase sa GDP/output.

Fiscal policy is more effective the flatter the *LM* curve.



The flatter the *LM* curve, the less the increase in interest rates and the greater the increase in GDP—**smaller crowding-out effect**

When the *LM* curve is vertical, shifts in the *IS* curve do not change the income



Effectiveness of Policies

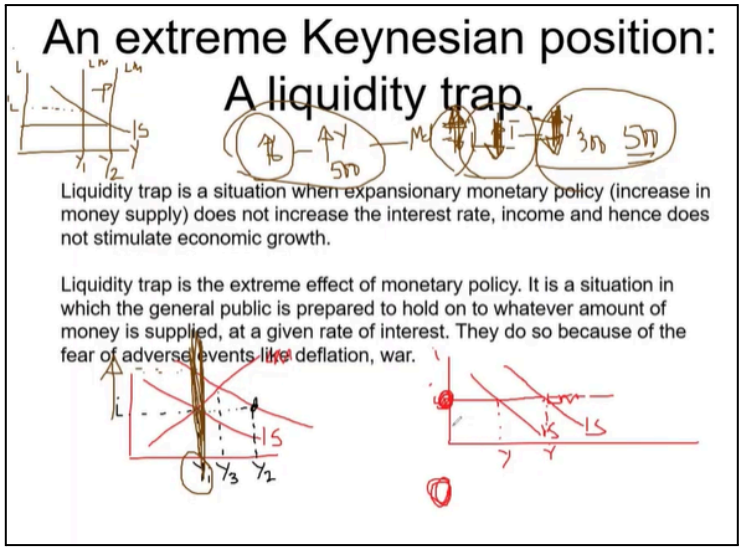
Mas effective ang monetary policy kapag flat ang IS curve dahil sensitive ang investment sa interest rate kaya mas malaki ang effect sa income/output. Mas effective rin ito kapag steep ang LM curve dahil less sensitive ang money demand sa interest rate.

Mas effective naman ang fiscal policy kapag flat ang LM curve dahil maliit lang ang pagtaas ng interest rate, maliit ang crowding out effect, at mas malaki ang increase sa GDP/output.

An extreme Keynesian position: A liquidity trap

Liquidity trap is a situation when expansionary monetary policy (increase in money supply) does not increase the interest rate, income and hence does not stimulate economic growth.

Liquidity trap is the extreme effect of monetary policy. It is a situation in which the general public is prepared to hold on to whatever amount of money is supplied, at a given rate of interest. They do so because of the fear of adverse events like deflation, war.


An extreme Keynesian position: A liquidity trap.
Liquidity trap is a situation when expansionary monetary policy (increase in money supply) does not increase the interest rate, income and hence does not stimulate economic growth.
Liquidity trap is the extreme effect of monetary policy. It is a situation in which the general public is prepared to hold on to whatever amount of money is supplied, at a given rate of interest. They do so because of the fear of adverse events like deflation, war.

Sa Classical case, vertical ang LM curve dahil insensitive ang money demand sa interest rate. Dahil dito:

- *ineffective ang fiscal policy*
- *effective ang monetary policy.*

Sa Keynesian case o liquidity trap, horizontal ang LM curve dahil hindi gumagalaw ang interest rate kahit magdagdag ng money supply. Dahil dito:

- *ineffective ang monetary policy*
- *effective ang fiscal policy.*